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## Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LIGHT EMITTING DEVICE AND FABRICATION METHOD THEREOF

conductive oxidation preventive layer	406
third metal-Al compound layer	405
first metallic layer	404
first metal-Ga compound layer	403
P <sup>+</sup> -(In, Al) GaN layer	402
P-(In, Al) GaN layer	401

(57) Abstract: The present invention discloses a light device and a fabrication method thereof. An object of the present invention is to provide the light device and the fabrication method thereof an electric/thermal/structural stability is obtained, and a P-type electrode and an N-type electrode can be simultaneously formed. In order to achieve the above object, the inventive light device includes: a GaN-based layer; a high concentration GaN-based layer formed on the GaN-based layer; a first metal-Ga compound layer formed on the high concentration GaN-based layer; a first metal layer formed on the first metal-Ga compound layer; a third metal -Al compound layer formed on the first metal layer; and a conductive oxidation preventive layer formed on the third metal-Al compound layer.

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR2003/002468

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H01L 33/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Korean Patents and applications for inventions, since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 226831 B ( LG ELECTRONICS INC.) 29 JULY 1999 see the figure 1d, 3d, detailed description of the invention	1-10 , 27-34
X	KR 2000-71682 A ( SUMITOMO ELECTRIC INDUSTRIES LTD ) 25 NOVEMBER 2000 see the embodiment 4	20-22
A	JP 11-40853 A ( SHOWA DENKO K.K.) 12 FEBRUARY 1999 see the whole document	20-22
Y	JP 11-97744 A ( SHARP CORP.) 9 APRIL 1999 see the claims 1-4, figure 6	23-26, 44-52
Y	JP 8-32115 A ( SHARP CORP.) 2 FEBRUARY 1996 see the claims 1-4, figure 6	23-26, 44-52

 Further documents are listed in the continuation of Box C. See patent family annex.

- \* Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

25 FEBRUARY 2004 (25.02.2004)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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**INTERNATIONAL SEARCH REPORT**International application No.  
PCT/KR2003/002468**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 286699 B (NICHIA CHEMICAL INDUSTRIES) 16 JANUARY 2001 see the whole document	1-52
A	JP 11-74558 A (TOSHIBA CORP.) 16 MARCH 1999 see the whole document	1-52
A	KR 2001-14823 A (SHARP K.K.) 26 FEBRUARY 2001 see the whole document	1-52
A	KR 2002-31683 A (LG INNOTEC CO., LTD) 3 MAY 2002 see the whole document	1-52

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/KR2003/002468

**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

- I. Claims 1-10 and 27-34 directed to an electrode composed of metal-Ga compound layer / metal / metal-Al compound layer / anti-oxidation layer
- II. Claims 11-19 and 35-43 directed an electrode composed of metal oxide layer / metal- metal oxide compound layer / 2nd metal layer containing metal dots
- III. Claims 20-22 directed to an electrode composed of highly doped metal oxide layer / transparent electrode
- IV. Claims 23-26 and 44-52 directed to an electrode composed of metal layers highly combined with Hydrogen

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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